

REMARKS

I. PENDING CLAIMS AND SUPPORT FOR AMENDMENTS

Upon entry of the present amendment, claims 14-23 will be pending in this application. Applicant has amended claim 14 to recite that the fiber is useful in applications where it will be repeatedly exposed to temperatures above 900 °C. Support for this amendment can be found in the specification at page 20, in Tables 7 and 8, which describes properties of the fibers of the invention when undergoing cyclic exposure to temperatures that are above 900 °C. New claim 23 recites that the insulation is used to insulate articles required to withstand temperatures above 900 °C for 3.5 hours or more. Support for this claim can be found in the specification at Figure 3, which shows such an exposure time.

No new matter has been added.

II. ANTICIPATION/OBVIOUSNESS REJECTIONS

In paragraph 4 of the Office action, the Examiner has rejected claims 14-22 under 35 U.S.C. § 102(b) as anticipated by, or in the alternative, under 35 U.S.C. § 103(a) as obvious over, Olds et al. (U.S. Patent No. 5,332,699 ("Olds '699")) or WO 87/05007 ("Olds '007")) or Karppinen et al. (WO 92/09536). Applicants respectfully traverse these rejections, and request reconsideration and withdrawal thereof.

None of the cited references anticipate the claimed methods, because none discloses materials having a maximum service temperature of above 900 °C, materials that are suitable for repeated exposure to temperatures exceeding 900 °C, or materials suitable for exposure to temperatures exceeding 900 °C for about 3.5 hours or more.

This is because the references either did not recognize the existence of an invention of selection of certain inorganic fibers that possess the above properties or disclose fibers for a completely different use, where such high temperatures are not even encountered, or both.

By contrast, the methods of the present invention provide fibers useful in situations requiring resistance to temperatures that may on occasion (i.e., repeatedly) exceed 900 °C for significant lengths of time. This is quite different from using fibers in situations where (a) there is no thermal cycling and the temperature remains relatively constant, and (b) the temperature increases above 900 °C, then decreases, and the fiber insulation is replaced prior to the next temperature increase.

Olds '007 is directed to the first situation. Olds '007 discloses fibers suitable for continuous use as insulating mats and blankets at temperatures ranging from 1370 °F (around 713 °C) to 1500 °F (around 815 °C), both well below the 900 °C threshold recited in the claims. As made clear in the Declaration of Leonard Olds filed in parent application U.S. Serial No. 08/535,587 (which is incorporated herein by reference), Olds himself was surprised to find that a subset of the fibers that he investigated could be used with continuous service temperatures of 900 °C or higher. Olds never recognized this, never separated these fibers conceptually from the rest of his broad disclosure, and never envisioned that the materials with which he was concerned could be used in applications requiring resistance against temperatures exceeding 900 °C. In fact, to use the fibers in such a way runs counter to the explicit teachings of Olds '007.

Thus, not only does Olds '007 fail to anticipate the claims, it teaches away from fibers having the properties recited in the claims. There would have been no motivation for one of ordinary skill in the art to expect that the fibers recited in the present claims would be suitable for use in insulating applications where the temperatures would exceed 900 °C. There would be even less motivation to subject any of the fibers of Olds '007 to environments where they would undergo the thermal stresses inherent in repeated exposure to such temperatures with any expectation that such fibers would not exhibit unacceptable shrinkage.

Olds '699 is similar to Olds '007 in that it also discloses a continuous use limit of at most 1600 °F (around 871 °C; see fiber 174, Table 2, column 10), also below the 900 °C threshold recited in the claims. However, Olds '699 is directed to fibers suitable as fire insulation products. As is well understood in this art, these products are exposed to high temperatures once (during a fire), and are then replaced. The Olds '699 fibers are evaluated for their ability to pass the ASTM E-119 fire resistance test. In this test, the insulating material is exposed to a temperature that ramps up to 1850 °F (1010 °C), but remains at this temperature for under 2 hours. This exposure only occurs once, because in use, the insulation is replaced after a fire.

Again, as evidenced by the Declaration of Leonard Olds, Olds himself was surprised to find that some of the materials he investigated could be used with a continuous service temperature above 900 °C. Olds certainly never contemplated that ~~the materials he was investigating would be suitable for prolonged or repeated~~ thermal exposure. To the contrary, his concern with materials suitable as fire

insulation would teach away from their use in prolonged or repeated thermal exposure, because fire insulation is generally replaced after exposure to the high temperatures of a fire. As with Olds '007, Olds '699 teaches away from the claimed invention; a worker of ordinary skill in this art would not have been motivated to use the materials of Olds '699 in applications that required prolonged or repeated exposure to temperatures above about 900 °C. Accordingly, Olds '699 would not have rendered the claims obvious to said worker.

Karppinen et al. completely fails to teach or suggest the use of the materials disclosed therein at high temperatures (i.e., at temperatures above 900 °C). Instead, the passage referenced by the Examiner mentions the use of mineral fibers as heat and sound insulation in the construction industry. In effect, the materials of Karppinen et al. are disclosed as useful for loft insulation in dwellings and office buildings, not as insulation against the high temperatures encountered in a ceramic kiln or furnace. Using dwelling loft insulation in such an application would be like expecting a woolly vest to protect one against the heat of a blowtorch.

As with the Olds references, Karppinen et al. completely fails to teach that the fibers disclosed therein can be suitable for use in applications requiring repeated or prolonged exposure to temperatures above about 900 °C, and so fails to anticipate the present claims. Moreover, Karppinen et al. teaches a use for its fibers that would result in exposure to much, much lower temperatures, and provides no suggestion to use the fibers in a high-temperature environment. Accordingly, Karppinen et al. fails to render the claims obvious.

Finally, although it is not clear that the Examiner intended to combine the reference teachings, his statement of the rejection leaves this unclear. In order to ensure that they are completely responsive, Applicants point out that combining the teachings of the Olds references together, or with Karppinen et al., does not cure the deficiencies of each as explained above. Accordingly, the combined teachings of the references fail to render the claims obvious under 35 U.S.C. § 103(a).

III. OBVIOUSNESS-TYPE DOUBLE PATENTING REJECTION

In paragraph 6 of the Office action, the Examiner has rejected claims 14-22 under the judicially created doctrine of obviousness-type double patenting over claims 1-9 of U.S. Patent No. 6,180,546. Applicants submit herewith a terminal disclaimer, which obviates this rejection.

Applicants submit that this application is in condition for immediate allowance, and an early notification to that effect is earnestly solicited. If the Examiner has any questions, or if any issues remain to be resolved, the Examiner is respectfully requested to contact the undersigned at 404.815.6218 so that said issues can be resolved prior to the issuance of a final rejection.

MARKED UP COPY OF AMENDMENTS TO SPECIFICATION AND CLAIMS

First paragraph of specification:

This application is a divisional of U.S. Serial No. 09/262,378 filed March 4, 1999, now [allowed] U.S. Patent No. 6,180,546 issued January 30, 2001, which is a continuation of U.S. Serial No. 08/899,005 filed July 23, 1997, now U.S. Patent No. 5,994,247 issued on November 30, 1999, which is a continuation of U.S. Serial No. 08/535,587 filed September 28, 1995, now abandoned, which is a continuation of U.S. Serial No. 08/039,086, filed April 9, 1993, now abandoned, which claims priority to International Application No. PCT/GB93/00085, filed January 15, 1993, which claims priority to GB 92 00993.5, filed January 17, 1992 and GB 92 24612.3, filed November 24, 1992.

14. (Amended) A method of insulating an article in applications requiring resistance against repeated exposure to temperatures [which may on occasion exceed] exceeding 900°C comprising:

disposing on, in, near or around the article thermal insulation which is a refractory insulating material having a maximum service temperature greater than 900°C and comprising vitreous fibers having a composition comprising SiO₂, CaO, MgO, and optionally Al₂O₃, wherein:

(a) SiO₂ is present in an amount (1) greater than 58% by weight SiO₂, if the amount of MgO in the composition is in the range 0 through 10 percent by weight; or (2) greater than the sum of (58 + 0.5(weight percent of MgO - 10)) percent by weight SiO₂, if the amount of MgO in the composition is greater than 10 percent by weight;

(b) an amount up to 42 percent by weight CaO;

(c) an amount up to 31.33 percent by weight MgO, and

(d) 0 to less than 3.97 percent by weight Al₂O₃;

wherein the refractory insulation material has a maximum service temperature greater than 900°C; the refractory insulation material has a shrinkage of less than 3.5 percent when exposed to a temperature of 1000°C for 24 hours, and has a shrinkage of less than 3.5 percent when exposed to a temperature of 800°C for 24 hours; and

wherein the refractory insulation material is essentially free of alkali metal oxide and boron oxide fluxing components.

Petition for Extension of Time

Pursuant to 37 C.F.R. 1.136(a), Applicants petition that the period for response to the Office Action dated February 4, 2001, in the above-identified application be extended for three months, up to and including August 4, 2001. The appropriate fee for this extension under 37 C.F. R. 1.17 accompanies this petition and response.

Please charge any deficiencies or credit any overpayment in fees to Deposit Order Account No. 11-0855.

Respectfully submitted,



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